



# SURVEY ON AUTOMATIC ACCIDENT DETECTION AND NOTIFICATION SYSTEM

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## Abstract

Traffic congestion and Road accidents are the major problems in urban areas. Also due to the delay in reaching of the ambulance to the accident location and the traffic congestion in between accident location and hospital increases the chances of the death of victim. So in order to provide solution for this problem, we develop an android application which detects accident automatically as well as sends notification to nearby emergency services like hospital, ambulance, police station along with his personal information. Automatic Accident Detection and Notification System(AADNS) is an application and is utilized to identify mishap and tell the concerned the emergency contacts enrolled with the installed application. The Input Module peruses sensor information on acceleration, orientation and effect and passes the gathered information to the Embedded Processor. The Embedded Processor assumes the part of an interpreter. The cell phone application goes about as the decision support and also the way to connect to offer assistance. The Data Center is facilitated by a web server that is overseen by a third party, (for example, the police division) and made promptly available by end clients. The system uses fuzzy logic in order to make a decision whether accident has occurred or not with the help of inputs from the sensors.

**Keywords:** Accelerometer, gyroscope, fuzzy logic , Embedded Processor, gps, gsm ;

## I. INTRODUCTION

In this day and age there is an extreme increment in the utilization of vehicles. Such substantial car use has expanded activity and

along these lines bringing about an ascent in street accidents. This incurs significant damage on the property and additionally causes human life misfortune as a result of inaccessibility of quick wellbeing facilities. Complete mishap aversion is unavoidable yet at any rate repercussions can be lessened. Proposed framework tries to give the emergency facilities to the casualties in the briefest time conceivable.

As human lives are in question, the discovery and reaction time are urgent factors for the victim(s) of a vehicle mishap and also the overseeing agencies. Indeed, even a slight decrease in the reaction time can diminish the number of fatalities and monetary loss by a huge factor.

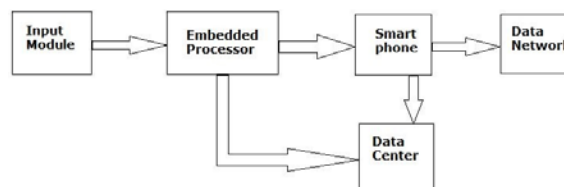


Fig.1 Smart Accident Detection System

The AADNS system uses the input from sensors and passes it to the smartphone via bluetooth. Using Fuzzy logic decision making algorithm, we can detect the occurrence of an accident with the inputs.

Registration includes user's personal info like blood group, etc. along with his photograph. In case of emergency, notification will be sent to nearest blood banks through mobile Search nearest Hospitals, police stations and blood bank. First user have to do registration to application then if any accident occurred then it is detected by GPS tracker and the personal details of those who have met with an

accident that has been already stored in database is sent to nearby blood bank, hospital, friends, family members. Global Positioning System (GPS) is used to identify the location of the vehicle. GSM is used to inform the exact vehicular location to the emergency numbers. Message will give longitude and latitude values. From these values location of accident can be determined. Such a module works the same as a regular phone.

## II. EXISTING SYSTEM

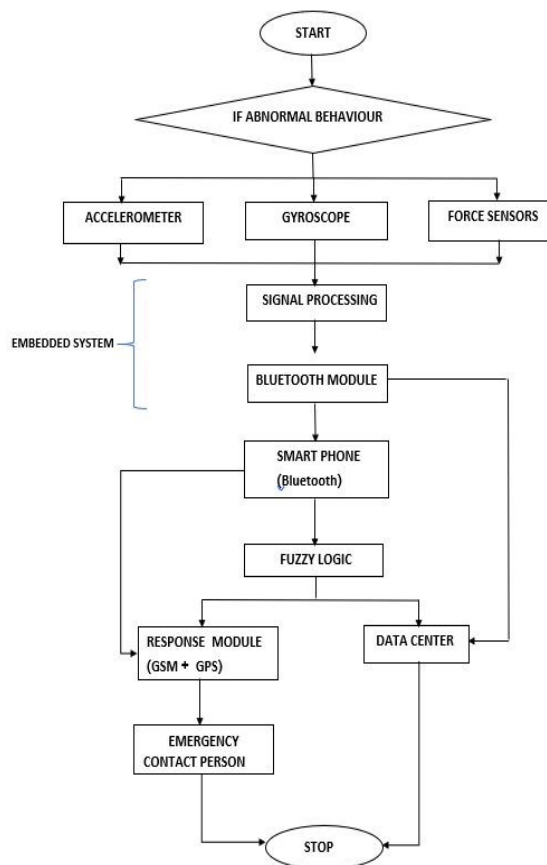
The OnStar framework is made by General Motors for mishap identification and robbery recognition for completely mechanized cars. The OnStar benefit enables clients to contact OnStar call focuses amid a crisis. In case of an impact, distinguished via airbag arrangement and different sensors, Advanced Automatic Collision Notification highlights can naturally send data about the vehicle's condition and GPS area to OnStar call focuses.

[2] In this framework the creator needs to pass on that the framework comprises of two units in particular, Crash Detector Embedded Unit and Android Control Unit. Crash Detector Embedded Unit is in charge of distinguishing the mishap condition utilizing three-hub accelerometer sensor, position encoder, guard sensor and one false alert switch. Bluetooth module (HC-05) is utilized to send the mischance notice to the casualty's android smart phone where an android application will get the GPS[4] area of mishap spot and contrast it and all the close-by doctor's facility's area to compute the most effective way and send the warning to the closest hospital as specified before as SMS Information in this system [3] is persistently taken from cell phone's accelerometer and investigated utilizing Dynamic Time Warping (DTW) to decide how seriously the mischance is happened. An e-Call System it consequently calls the closest crisis Center. Regardless of the possibility that no traveler can talk, a Minimum Set of Data is sent, which incorporates the correct area of the Accident Site. Shortly after the accident, emergency services therefore know that there has been an accident, and where exactly.

In this paper the author[5] has proposed the utilization of Wireless Sensor Network and Radio Frequency Identification Technologies. Sensors will be introduced in a vehicle which will identify mischance area and speed of the vehicle. These sensors will then send a ready flag to a checking station and observing station, thus, will track the area where the mishap has happened.

## III. AADNS- PROPOSED SYSTEM ARCHITECTURE

The accelerometer, gyroscope and force sensor measures the behavior of the car and inputs the data to the embedded processor where the signals are processed. The processor then, using the Bluetooth module, sends the calibrated data to the smartphone. The fuzzy logic decision support – programmed in the mobile application – receives the processed data and makes a decision of detection or nondetection. At detection, the smartphone application, through the data network, sends a text message to the emergency contact/public safety.



#### IV. EQUIPMENTS AND PROPOSED METHODOLOGY

##### A. Input Module

The Input Module peruses sensor information on increasing speed, turn and power and passes the gathered information to the Implanted Processor. The accelerometer is additionally utilized to compute the speed of the vehicle that is utilized as a part of the fuzzy logic choice help segment. The Gyroscope detects the rotation/tilt of the car and peruses the information in the wake of preparing in degrees every second. The four power sensors situated at each side of the car identify the effect power of the mishap.

##### B. Embedded Processor

The Embedded Processor assumes the part of an interpreter. It incorporates a flag handling module that specimens the adjusted information consistently, and a Bluetooth module that sends the adjusted information to the cell phone. What's more, utilizing the readings of the accelerometer, the speed of the vehicle is computed and utilized by the choice help segment in the cell phone.

##### C. Smartphone

The cell phone application goes about as the choice help and additionally the way to connect for offer assistance. It is made out of a Bluetooth Module, the fuzzy logic choice help and the reaction module that empowers sharing of data with an outsider (a crisis contact, police or rescue vehicle benefit). The Bluetooth module of the cell phone is in charge of discussing information with the microchip.

##### D. Fuzzy Logic Model : Mamdani

In the real world there exists much fuzzy knowledge, i.e., knowledge that is vague, imprecise, uncertain, ambiguous, inexact, or probabilistic in nature. Human thinking and reasoning frequently involve fuzzy information, possibly originating from inherently inexact human concepts and matching of similar rather than identical experiences.

Fuzziness Fuzziness occurs when the boundary of a piece of information is not clear-cut. For example, concepts such as young, tall, good, or high are fuzzy. There is no single quantitative value which defines the term young. For some people, age 25 is young, and for others, age 35 is young. In fact the concept young has no clean

boundary. Age 1 is definitely Young and age 100 is definitely not young; however, age 35 has some possibility of being young and usually depends on the context in which it is being considered. The representation of this kind of information is based on the concept of fuzzy set theory.

##### 1. Linguistic Variables

Linguistic variables are the input or output variables of the system whose values are words or sentences from a natural language, instead of numerical values. A linguistic variable is generally decomposed into a set of linguistic terms. Let temperature (t) is the linguistic variable which represents the temperature of a room. To qualify the temperature, terms such as "hot" and "cold" are used in real life. These are the linguistic values of the temperature. Then,  $T(t) = \{\text{too-cold, cold, warm, hot, too-hot}\}$  can be the set of decompositions for the linguistic variable temperature. Each member of this decomposition is called a linguistic term and can cover a portion of the overall values of the temperature.

##### 2. Membership Functions

Membership functions are used in the fuzzification and defuzzification steps of a FLS, to map the non-fuzzy input values to fuzzy linguistic terms and vice versa. A membership function is used to quantify a linguistic term. Note that, an important characteristic of fuzzy logic is that a numerical value does not have to be fuzzified using only one membership function. In other words, a value can belong to multiple sets at the same time. For example, a temperature value can be considered as "cold" and "too-cold" at the same time, with different degree of memberships.

##### E. GSM Module

A GSM digitizes and decreases the information, at that point sends it down through a channel with two unique floods of customer information, each in its own specific schedule vacancy. The computerized framework has a capacity to convey 64 kbps to 120 Mbps of information rates. There are different cell sizes in a GSM framework, for

example, large scale, smaller scale, pico and umbrella cells. Every cell changes according to the usage area. There are five diverse cell sizes in a GSM organize full scale, smaller scale, pico and umbrella cells. The scope zone of every cell differs as indicated by the execution condition.

#### F. GPS Module

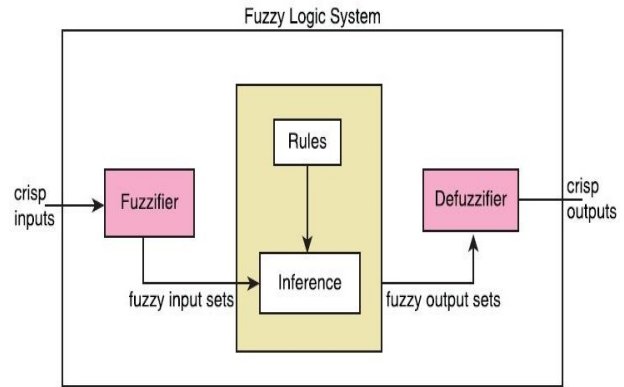
A GPS is a worldwide route satellite framework that gives geolocation and time data to a GPS recipient anyplace on or close to the Earth where there is an unhindered viewable pathway to at least four GPS satellites. The GPS framework does not require the client to transmit any information, and it works freely of any telephonic or web gathering, however these advances can upgrade the value of the GPS situating data. The GPS framework gives basic situating abilities to military, common, and business clients around the globe.

#### V. IMPLEMENTATION PLAN

The input module of the proposed system that comprises accelerometer (MPU-6050), gyroscope and force sensors (4-6) collect information from the vehicle. These input systems send information to microcontroller processor( Arduino pro mini). It transfers the information to the bluetooth module which then sends data to the android application. This application is run on a smartphone and it takes the location details from Network provider and sends message to concerned authority.

Fuzzy Logic Algorithm:

1. Define the linguistic variables and terms (initialization)
2. Construct the membership functions (initialization)
3. Construct the rule base (initialization)
4. Convert crisp input data to fuzzy values using the membership functions (fuzzification).
5. Evaluate the rules in the rule base (inference)
6. Combine the results of each rule (inference)
7. Convert the output data to non-fuzzy values (defuzzification)



#### VI. APPLICATIONS

##### A. Safety

It offers the users safety and security using our android software at very convenient prices. Because of the reach of smartphones, it can be used by all the members of a family. It can also be used by School buses so as to seek help in case of emergency.

##### B. Medical Help

In emergencies receiving medical attention on time can make the difference. The GPS module will identify the location and immediately send notifications to nearby hospitals, police stations and emergency contacts.

##### C. Vehicle Tracking

Car companies need to track vehicles for insurance or other monitoring purposes can now plot the real-time vehicle location on a map and closely monitor movement and operating status.

##### D. Economic Loss

One particular concern that Public Safety Organizations (PSO) must account for whilst engaging in many activities is decreasing the effect of vehicle accidents, aiding as many injured people as possible and providing 24/7 on the spot rescue. Currently, Road traffic crashes rank as the 9th leading cause of death and account for 2.2% of all deaths globally.

With automatic accident detection this number can be reduced

#### VII. ACKNOWLEDGMENT

We remain immensely obliged to my project guide Prof. Payel Thakur, for her valuable guidance, patience, keen interest and constant encouragement and for her invaluable support. I would like to thank my college Pillai College of Engineering and

Dr.Madhumita Chatterjee, H.O.D. of Computer Department and Dr. Sharvari Govilkar, H.O.D of Information Technology Department for their invaluable support. I would also like to thank Dr. R.I.K Moorthy, Principal for his invaluable support and for providing an outstanding academic environment. I would also like to thank all the staff members of the department of Computer and Information Technology

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